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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/028,145	12/20/2001	Ching-Pang Lee	13DV14114	2460

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EXAMINER	
VERDIER, CHRISTOPHER M	
ART UNIT	**PAPER NUMBER**
3745	

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11

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/028,145	Applicant(s) LEE ET AL.	
	Examiner Christopher Verdier	Art Unit 3745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *1-6-04*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2 and 4-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2 and 4-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 December 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Applicants' Reply dated January 6, 2004 has been carefully considered but is deemed non-persuasive. Claims 1-2 and 4-12 are pending.

With regard to the rejection of claims 1-2 and 7-9 under 35 U.S.C. 103(a) as being unpatentable over Andersen 4,142,824 in view of Japanese Patent 64-53,002 and Chandley 3,423,069, and the rejection of claims 1, 6-7, and 12 under 35 U.S.C. 103(a) as being unpatentable over Andersen 4,142,824 in view of Japanese Patent 64-53,002 and Craig 4,501,053, Applicants have argued that the reasoning that it would have been obvious to form the metal sleeve 58 of Anderson from the alloys taught by either Chandley or Craig, and to select the thickness of the modified sleeve to a specific value such as about 0.51 mm (because Applicant has not disclosed that the specific thickness is critical or solves any stated problem, and it appears that the modified airfoil would perform equally as well with metal sleeves of differing thicknesses) do not provide a sufficient basis to support the rejections. Applicants have further argued that there is no motivation or suggestion to modify the sleeve 58 to a specific thickness, and that the alleged failure of Applicants to disclose the criticality of the thickness does not provide the required motivation, and that the lack of a criticality does not automatically make a limitation obvious. Applicants have further argued that the assertion that the modified airfoil would perform equally as well with sleeves of differing thicknesses also does not make the proposed modification obvious. These arguments are respectfully not persuasive. MPEP 2144.05 states that differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical, and that ""[W]here the general conditions of a claim are

disclosed by the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955)". MPEP 2144.05 also states that in order to rebut a *prima facie* case of obviousness, Applicant must show criticality of the claimed range, and notes that ""The law is replete with cases in which the difference between the claimed invention and the prior art is some range or other variable within the claims ... In such a situation, the applicant must show that the particular range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range." *In re Woodruff*, 919 F.2d 1575, 16USPQ2d 1934 (Fed. Cir. 1990)." Applicants' specification is silent as to why a specific thickness of 0.51mm is critical, and does not disclose that this particular thickness solves any stated problem or is for any stated purpose. In addition, MPEP 716.02(b) states that the burden is on Applicant to establish results that are unexpected and significant. Because Applicants are relying on the special definition of a "high temperature foil" as disclosed on page 5, lines 1-19 of Applicants' specification, to mean a structure made from an alloy with improved strength and oxidation resistance over conventional superalloys at temperatures above 1093 degrees C (2000 degrees F), and capable of being formed to a thickness of about 0.51 mm (0.020 inches or less), the burden is on Applicants to establish results that are unexpected and significant.

With regard to Applicant's argument that there is no suggestion or motivation in the prior art that the metal sleeve 58 of Andersen could be modified into a high temperature foil, the examiner disagrees. The metal sleeve 58 of Andersen appears to be very thin relative to the airfoil, and selecting a specific thickness would be obvious to one of ordinary skill in the art,

since Applicant has not disclosed that the specific thickness in the specification of about 0.51 mm (0.020 inches or less) is critical. Chandley teaches that airfoil 10 for a high temperature gas turbine engine may have a shield 28 made of platinum/rhodium alloy, for the purpose of protecting the airfoil by virtue of the platinum/rhodium alloy preventing melting of the leading edge region. Column 4, lines 33-38 state that the shield material provides corrosion resistance and high strength at high temperatures. Craig 4,501,053 (figures 3 and 5) shows a turbine blade having a shell 34 in the form of a nickel-base superalloy (see column 6, lines 5-17), for the purpose of providing the turbine blade with good resistance to corrosion and high strength at elevated temperatures. It is respectfully submitted that the above reasons provide motivation that the metal sleeve 58 of Andersen may be modified into a high temperature foil.

Applicants' have argued that Japanese Patent 64-53,002 does not clearly teach an outer wall having ends adjacent the leading and trailing edges, because it is unclear if figure 1c thereof shows two covering members, one each on the suction side and pressure side, or a single covering member that wraps around the blade 1 and is extremely thin over the leading and trailing edges. Applicants have further argued that the English abstract thereof clearly describes a single covering member 3 closing the grooves 2. Finally, Applicants have argued that figure 1c of Japanese Patent 64-53,002 cannot be relied on because it appears to show that the covering member on the suction side does not cover the groove closest to the trailing edge, which is contrary to the intent of the patent. These arguments are not persuasive, because Anderson, at column 5, line 45 and column 6, lines 1-2, and referring to the sheet metal sleeve 58, states that a full circumferential band is neither required nor desired in some instances. The Japanese Patent

64-53,002 (figures 1a-1c) shows an airfoil 1 and teaches that a metal sheath 3 (which is an outer wall) has a first unnumbered end that is adjacent to the leading edge and a second unnumbered end that is adjacent to the trailing edge, for the purpose of protecting the airfoil from hot working fluid. Because Anderson discloses that a full circumferential band is neither required nor desired in some instances, and because the Japanese Patent 64-53,002 discloses a covering member 3 on both the pressure and suction sides of the airfoil 1, it would be *prima facie* obvious to apply the teachings of the Japanese Patent to the metal sleeve 58 of Anderson. An oral translation of the Japanese Patent revealed that it is silent as to whether covering member 3 is a single piece or two pieces, but it is the examiner's position that it is irrelevant whether covering member 3 is a single piece or two pieces, because the Japanese Patent still teaches that metal sheath 3 has a first unnumbered end that is adjacent to the leading edge and a second unnumbered end that is adjacent to the trailing edge, for the purpose of protecting the airfoil from hot working fluid. With regard to Applicants' argument that figure 1c of Japanese Patent 64-53,002 cannot be relied on because it appears to show that the covering member on the suction side does not cover the groove closest to the trailing edge, which is contrary to the intent of the patent, this argument is not persuasive, because the English language abstract thereof states (and the oral translation confirms) that the grooves 2 are covered by the covering member 3, and figure 1c clearly shows that the sheath extends on both the pressure and suction sides to cover the grooves closest to the trailing edge, via the thinnest portion of the covering member 3.

Applicants' additional arguments on pages 4-5 of the reply based on the additional combinations of references are that the there is no suggestion to modify sleeve 58 of Andersen to

be a "high temperature foil" as defined in the Applicants' specification. These arguments are disagreed with for the reasons set forth above.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-2 and 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Andersen 4,142,824 in view of Japanese Patent 64-53,002 and Chandley 3,423,069. Andersen discloses an airfoil 20 substantially as claimed including a root 16, a tip near 46, a leading edge 26, a trailing edge 28, a first wall 44 extending from the leading edge to the trailing edge, a second wall 42 extending from the leading edge to the trailing edge, with the second wall 42

having ribs 55 extending therefrom, and outer wall 58 disposed in spaced apart relationship with the second wall 42 and attached to the ribs 55, with the outer wall comprising a foil. The outer wall is spaced apart from the second wall interior periphery, due to the presence of slots 54. An interface layer in the form of brazing material is disposed between the ribs 55 and the foil outer wall 58. Note suction side tip wall 42 and pressure side tip wall 44. The pressure side tip wall 44 is offset from the pressure side wall 24 to define a tip shelf near 56 extending circumferentially and having at least one rib 55 extending therefrom. The outer tip wall 58 is disposed on the pressure side of the tip in spaced apart relation with the pressure side tip wall 44. However, Andersen does not disclose that a first end of the outer wall is adjacent to the leading edge and a second end of the outer wall is adjacent to the trailing edge, and does not disclose that foil 58 is a high temperature foil as given the special meaning defined in the specification (an alloy with improved strength and oxidation resistance over conventional superalloys at temperature above 1093 degrees C (2000 degrees F) and capable of being formed to a thickness of about 0.51 mm (0.020 inches or less)), with the foil comprising rhodium-based alloy.

Japanese Patent 64-53,002 (figures 1a-1c) shows a turbine blade in the form of an airfoil 1 having an metal sheath 3 (which is an outer wall) which has a first unnumbered end that is adjacent to the leading edge and a second unnumbered end that is adjacent to the trailing edge, for the purpose of protecting the airfoil from hot working fluid along the pressure and suction sides of the airfoil. Column 5, line 45 and column 6, lines 1-2 of Andersen, which refer to the sheet metal sleeve 58, state that a full circumferential band is neither required nor desired in some instances.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the sleeve 58 of Andersen such that a first end of the outer wall is adjacent to the leading edge and a second end of the outer wall is adjacent to the trailing edge, as taught by Japanese Patent 64-53,002, for the purpose of protecting the airfoil from hot working fluid along the pressure and suction sides of the airfoil.

Chandley (figure 2) shows an airfoil 10 for a high temperature gas turbine engine having a shield 28 made of platinum/rhodium alloy, for the purpose of protecting the airfoil by virtue of the platinum/rhodium alloy preventing melting of the leading edge region. Column 4, lines 33-38 state that the shield material provides corrosion resistance and high strength at high temperatures.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to form the modified airfoil of Andersen such that the foil is of platinum/rhodium alloy, as taught by Chandley, for the purpose of protecting the airfoil by virtue of the platinum/rhodium alloy preventing melting of the airfoil. With regard to Applicant's specific definition in the specification of the high temperature foil being capable of being formed to a thickness of about 0.51 mm (0.020 inches or less), sleeve 58 of Andersen appears to be very thin relative to the airfoil, and it would have been obvious to one of ordinary skill in the art to select the thickness to a specific value, such as about 0.51 mm (which appears to be within the range of conventional commercial sheet metal), since Applicant has not disclosed that such a

specific thickness is critical, or solves any stated problem or is for any stated purpose, and it appears that the modified airfoil of Andersen would perform equally as well with metal sleeves of differing thicknesses.

Claims 4 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Andersen and Japanese Patent 64-53,002 and Chandley as applied to claims 1 and 9, respectively above, and further in view of Mizuhara 4,447,391. The modified airfoil of Andersen shows all of the claimed subject matter except for the interface layer comprising chromium, palladium, and nickel.

Mizuhara 4,447,391 shows a brazing alloy containing specific amounts of chromium, palladium, and nickel, for the purpose of providing improved corrosion and oxidation resistance in the brazing alloy.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to utilize a brazing alloy of chromium, palladium, and nickel for the interface layer in Andersen, as taught by Mizuhara, for the purpose of providing improved corrosion and oxidation resistance in the brazing alloy.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Andersen and Japanese Patent 64-53,002 and Chandley and Mizuhara as applied to claim 4 above, and further in view of Lee 5,733,102. The modified airfoil of Andersen shows all of the claimed subject

matter including first and second walls 44, 42, respectively, but does not show that the first and second walls are made of a nickel-base superalloy.

Lee 5,733,102 (figure 1) shows a turbine blade having first and second walls 24, 26, made of a nickel-base superalloy, for the purpose of providing suitable strength at high temperature operation.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to form the modified airfoil of Andersen 4,142,824 such that the first and second walls of the airfoil are made of a nickel-base superalloy, as taught by Lee 5,733,102, for the purpose of providing suitable strength at high temperature operation.

Claims 1, 6-7, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Andersen 4,142,824 in view of Japanese Patent 64-53,002 and Craig 4,501,053. Andersen 4,142,824 discloses an airfoil 20 substantially as claimed including a root 16, a tip near 46, a leading edge 26, a trailing edge 28, a first wall 44 extending from the leading edge to the trailing edge, a second wall 42 extending from the leading edge to the trailing edge, with the second wall 42 having ribs 55 extending therefrom, and outer wall 58 disposed in spaced apart relationship with the second wall 42 and attached to the ribs 55, with the outer wall comprising a foil. The outer wall is spaced apart from the second wall interior periphery, due to the presence of slots 54. An interface layer in the form of brazing material is disposed between the ribs 55 and the foil outer wall 58. Note suction side tip wall 42 and pressure side tip wall 44. The pressure side tip

wall 44 is offset from the pressure side wall 24 to define a tip shelf near 56 extending circumferentially and having at least one rib 55 extending therefrom. The outer tip wall 58 is disposed on the pressure side of the tip in spaced apart relation with the pressure side tip wall 44. However, Andersen does not disclose that a first end of the outer wall is adjacent to the leading edge and a second end of the outer wall is adjacent to the trailing edge, and does not disclose that foil 58 is a high temperature foil as given the special meaning defined in the specification (an alloy with improved strength and oxidation resistance over conventional superalloys at temperature above 1093 degrees C (2000 degrees F) and capable of being formed to a thickness of about 0.51 mm (0.020 inches or less)), with the foil comprising a nickel-based alloy.

Japanese Patent 64-53,002 (figures 1a-1c) shows a turbine blade in the form of an airfoil 1 having an metal sheath 3 (which is an outer wall) which has a first unnumbered end that is adjacent to the leading edge and a second unnumbered end that is adjacent to the trailing edge, for the purpose of protecting the airfoil from hot working fluid along the pressure and suction sides of the airfoil. Column 5, line 45 and column 6, lines 1-2 of Andersen, which refer to the sheet metal sleeve 58, state that a full circumferential band is neither required nor desired in some instances.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the sleeve 58 of Andersen such that a first end of the outer wall is adjacent to the leading edge and a second end of the outer wall is adjacent to the trailing edge, as

taught by Japanese Patent 64-53,002, for the purpose of protecting the airfoil from hot working fluid along the pressure and suction sides of the airfoil.

Craig 4,501,053 (figures 3 and 5) shows a turbine blade having a shell 34 in the form of a nickel-base superalloy (see column 6, lines 5-17), for the purpose of providing the turbine blade with good resistance to corrosion and high strength at elevated temperatures.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to form the modified foil of Andersen of a nickel-base alloy, as taught by Craig, for the purpose of providing good resistance to corrosion and high strength at elevate temperatures. With regard to Applicant's specific definition in the specification of the high temperature foil being capable of being formed to a thickness of about 0.51 mm (0.020 inches or less), sleeve 58 of Andersen appears to be very thin relative to the airfoil, and it would have been obvious to one of ordinary skill in the art to select the thickness to a specific value, such as about 0.51 mm (which appears to be within the range of conventional commercial sheet metal), since Applicant has not disclosed that such a specific thickness is critical, or solves any stated problem or is for any stated purpose, and it appears that the modified airfoil of Andersen would perform equally as well with metal sleeves of differing thicknesses.

Claim 4 is also rejected under 35 U.S.C. 103(a) as being unpatentable over Andersen and Japanese Patent 64-53,002 and Craig as applied to claim 1 above, and further in view of

Mizuhara 4,447,391. The modified airfoil of Andersen shows all of the claimed subject matter except for the interface layer comprising chromium, palladium, and nickel.

Mizuhara 4,447,391 shows a brazing alloy containing specific amounts of chromium, palladium, and nickel, for the purpose of providing improved corrosion and oxidation resistance in the brazing alloy.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to utilize a brazing alloy of chromium, palladium, and nickel for the interface layer in Andersen, as taught by Mizuhara, for the purpose of providing improved corrosion and oxidation resistance in the brazing alloy.

Claim 5 is also rejected under 35 U.S.C. 103(a) as being unpatentable over Andersen and Japanese Patent 64-53,002 and Craig and Mizuhara as applied to claim 4 above, and further in view of Lee 5,733,102. The modified airfoil of Andersen shows all of the claimed subject matter including first and second walls 44, 42, respectively, but does not show that the first and second walls are made of a nickel-base superalloy.

Lee 5,733,102 (figure 1) shows a turbine blade having first and second walls 24, 26, made of a nickel-base superalloy, for the purpose of providing suitable strength at high temperature operation.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to form the modified airfoil of Andersen 4,142,824 such that the first and second walls of the airfoil are made of a nickel-base superalloy, as taught by Lee 5,733,102, for the purpose of providing suitable strength at high temperature operation.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Andersen and Japanese Patent 64-53,002 and Chandley and Mizuhara as applied to claim 10 above, and further in view of Lee 5,733,102. The modified airfoil of Andersen shows all of the claimed subject matter including first and second walls 44, 42, respectively, but does not show that the pressure side tip wall is made of a nickel-base superalloy.

Lee 5,733,102 (figure 1) shows a turbine blade having a pressure side tip wall 24/38a, made of a nickel-base superalloy, for the purpose of providing suitable strength at high temperature operation.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to form the modified airfoil of Andersen 4,142,824 such that the pressure side tip wall of the airfoil is made of a nickel-base superalloy, as taught by Lee 5,733,102, for the purpose of providing suitable strength at high temperature operation.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher Verdier whose telephone number is (703)-308-2638. The examiner can normally be reached on Monday-Friday from 10:00-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward K. Look can be reached on (703) 308-1044. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

C.V.
February 17, 2004

Christopher Verdier
Primary Examiner
Art Unit 3745